



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,487	08/30/2001	Yakov Epshteyn	SFI 718D1	9680

27782 7590 01/22/2003

SPEEDFAM-IPEC CORPORATION  
305 NORTH 54TH STREET  
CHANDLER, AZ 85226

EXAMINER

TRAN, BINH X

ART UNIT	PAPER NUMBER
----------	--------------

1765

4

DATE MAILED: 01/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/943,487

Applicant(s)

EPSHTEYN ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 8-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Response to Preliminary Amendment***

1. In the preliminary amendment the applicants request to cancel claims 1-7, and renumber the remaining claims accordingly. Claims 1-7 have been canceled according to the applicants' request. However, the PTO does not renumber the remaining claims. The examiner wishes to remind the applicants the rule of 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

### ***Claim Objections***

2. Claims 14-18 are objected to because of the following informalities: In claim 14-18, there is a typo-error "The apparatus of claim" should have been "The method of claim".

The examiner wishes to remind applicant of the telephone conversation on 1-14-2003, where Mr. James Farmer agrees with the examiner that claims 14-17 should reflect method claim not apparatus claim. For the purpose of examination, the examiner will interpret that claims 14-17 are method claims. However, the examiner does not make an examiner's amendment to correct the typo-error for claims 14-18. The applicants are required to make an amendment to correct the error so that claims 14-17 reflect method claims.

3. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

In claim 10, the applicants wrote, "wherein a set of buff station parameter may be different ... for the buffing step". The examiner interprets the term "may be" means perhaps, possibly, by chance. Thus the limitation right after the term "may be" is not required or guarantee to occur. If the limitation right after the term "may be" is not required, then this claim fail to further limit the subject matter of a previous claim.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 22 "pad conditioning step is performed between intermittent wafers being processed" (emphasis added) is vague and indefinite. The examiner does not understand what is the meaning of the term "between intermittent"

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1765

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

7. Claims 8-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Yu et al. (US 6,165,052).

Yu teaches a method for processing a surface of a semiconductor wafer comprising the steps of:

removing the material (220) overlying the barrier layer (215) from the wafer surface at a first polishing station (i.e. primary polishing station) with a first polishing pad (primary polishing pad) (col. 6, specific col. 6 lines 45-49, step 300 of Fig 3);

removing the barrier layer from the wafer surface at a second station (read on buff station) using a set of second station parameters (col. 6, step 320 of Fig 3).

Respect to claim 9, Yu discloses a step of buffing the wafer surface after the barrier layer removal (col. 6 lines line 51-53, step 330 of Fig 3). Respect to claim 10, Yu discloses the set of second station parameters (buff station parameter) is different for the barrier removal step than for the buffing step. Respect to claim 11, Yu discloses a different slurry composition is used for the barrier removal step (step 320) than for the buffing step (step 330). Respect to claim 12, Yu discloses the step of detecting when the material layer is substantially removed from the wafer surface (step 310).

8. Claims 8-14, 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Easter et al. (US 6,368,955).

Art Unit: 1765

Easter teaches a method for processing a surface of a semiconductor wafer comprising the steps of:

removing the material (16) overlying the barrier layer (liner 14) from the wafer surface at a first polishing station (i.e. primary polishing station) with a first polishing pad (primary polishing pad) (col. 4 line 65 col. 5 lines 30);

removing the barrier layer (14) from the wafer surface at a second station (read on buff station) using a set of second station parameters (col. 5 lines 59-67).

Respect to claim 9, Easter discloses a step of buffing the wafer surface after the barrier layer (14) removal (col. 6 lines 1-7). Respect to claim 10, Easter discloses the set of second station parameters (read on buff station parameter) is different for the barrier removal step than for the buffing step. Respect to claim 11, Easter discloses a different slurry composition is used for the barrier removal step (i.e., second polishing step) than for the buffing step. Respect to claim 12, Easter discloses the step of detecting when the material layer is substantially removed from the wafer surface (col. 5 lines 31-44). Respect to claim 13-14, Easter discloses the step of detecting a point at which the barrier layer (liner 14) removal is substantially complete using endpoint detection system (col. 5 lines 60-67). Respect to claims 23-24, Easter discloses the material (16) is comprised of copper and the barrier layer (liner 14) is comprised of Ta or TaN (col. 6 lines 9-11). Respect to claim 25, Easter discloses supplying a first polishing slurry to the first polishing station (read on "primary polishing station") and supplying a different polishing slurry to the second station (read on "buff station") (col. 6-7).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 15, 17, 19, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easter in view of Somekh (Us 5,897,426).

Respect to claims 15 and 17, Easter fails to disclose the endpoint detection system is comprise of an optical and/or laser detection system. However, Easter clearly discloses the use of the endpoint detection system. In a semiconductor method, Somekh discloses the use of the laser endpoint detection system (col. 4 lines 36-48). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter in view of Somekh by using the optical or laser detection system because equivalent and substitution of one for the other would produce an expected result.

Respect to claim 19, Easter fails to disclose the step of conditioning the buff station pads. Somekh discloses the step of conditioning the pad (col. 3 lines 11-17). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter in view of Somekh by conditioning the pad because it will maintain the pad so that it will effectively remove any material from the substrate. Respect to claim 21, Somekh discloses the conditioning step is accomplished by pressing the lower pad

Art Unit: 1765

(30) against the upper pad and rotating each pad at different velocity (col. 3 lines 11-17, Fig 1).

11. Claims 19, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easter in view of Woo (US 5,816,891).

Respect to claim 19, Easter fails to disclose the step of conditioning the buff station pads. Woo discloses the step of conditioning the pad (col. 7 lines 35-56). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter in view of Woo by conditioning the pad because it will maintain the pad so that it will effectively remove any material from the substrate. Respect to claims 21-22, Woo discloses the pad-conditioning step is performed between wafer(s) being processed (col. 7 lines 35-56).

12. Claims 15-16, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easter in view of Mikhaylich et al. (US 6,375,540).

Respect to claims 15-16, Easter fails to disclose the endpoint detection system is comprises of an optical and/or infra red detection system. However, Easter clearly discloses the use of the endpoint detection system. In a semiconductor method, Mikhaylich discloses the use of the infra red detection system (col. 7 lines 41-57). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter in view of Mikhaylich by using the optical and/or infra red detection system because equivalent and substitution of one for the other would produce an expected result.



Respect to claim 19, Easter fails to disclose the step of conditioning the buff station pads. Mikhaylich discloses the step of conditioning the pad (col. 6 lines 38-45). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter in view of Mikhaylich by conditioning the pad because it will maintain the pad so that it will effectively remove any material from the substrate.

Respect to claim 20, Mikhaylich discloses the conditioning step is accomplished by pressing the lower pad against the upper pad and rotating each pad at different velocity (col. 6 lines 38-45). Respect to claims 21-22, Mikhaylich discloses that the conditioning step is performed ex-situ manner (read on "performed between wafers being processed" col. 6 lines 40-45).

13. Claims 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Easter (US 6,368,955) in view of Easter (US 6,254,454).

Easter ('955) fails to disclose the endpoint detection system is comprises of motor current detection system. However, Easter ('955) clearly discloses the use of the endpoint detection system. In a semiconductor method, Easter ('454) discloses the use of the motor current detection system. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Easter ('955) in view of Easter ('454) by using the motor current detection system because equivalent and substitution of one for the other would produce an expected result.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-


Art Unit: 1765

1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran  
January 16, 2003

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700